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"AN AIR-BAG"

THE PRESENT INVENTION relates to an air-bag and more particularly relates to an air-bag in the form of an inflatable curtain.

It has been proposed previously to provide an air-bag in the form of an inflatable curtain, the air-bag being configured to be mounted in a motor vehicle along the roof line of the vehicle above the doors. The air-bag is associated with a gas generator to inflate the air-bag in the event that an accident should occur. The inflated air-bag is intended to extend between an occupant of the vehicle and the adjacent doors.

Many designs of inflatable curtain have been proposed previously but reference is made to Figure 1 of the accompanying drawings which illustrates a typical design.

Referring initially to Figure 1, an air-bag 1 in the form of an inflatable curtain has a main region 2 of generally rectangular form, the main region incorporating a first inflatable zone 3 divided into a plurality of cells 4 by seams 5, and a second inflatable zone 6 divided into cells 7 by means of seams 8. The two inflatable zones 3 and 6 are separated by a substantially uninflatable zone 9.

A first projection 10 is provided at one end of the lower edge of the inflatable curtain, to be connected to a strap, and a further projection 11 is provided at the other end of the lower edge to be connected to a further strap.

Along the upper edge of the air-bag, a gas flow duct 12 is provided which communicates with the inflatable cells of the first zone 3 and the inflatable cells of the second zone 6. The gas duct 12 is provided with an end portion 13 configured to be connected to a gas generator. The uppermost edge 14 of the air-bag is provided with a plurality of evenly spaced mounting tabs 15 each being provided with an aperture 16.

The air-bag as described is one example of many different designs of air-bag of the inflatable-curtain type that are in use.

In the described arrangement, the mounting tabs 15 are formed of a single layer of fabric. However, it has been found that the mounting tabs 15 may not be sufficiently strong to withstand the forces applied to the mounting tabs during deployment of the air-bag. Here it is to be understood that the air-bag is deployed within a very brief period of time in response to a signal from a sensor responsive to a side impact or rollover situation. The gas that inflates the air-bag is injected into the gas flow duct 12 in a very aggressive manner, and it is not unknown for the mounting tabs 15 to become damaged as a result.

It has been proposed to modify the mounting tabs either by providing a stitched re-enforcement or, alternatively, by forming the tabs by initially providing an over-sized piece of fabric at the position where each tab is to be, and then folding the fabric over and effecting a stitching operation to provide a

mounting tab of enhanced strength. Such techniques are, however, undesirable as they are labour intensive and therefore costly.

The present invention seeks to provide an improved air-bag.

Accordingly, the present invention provides an air-bag, the air-bag comprising at least one inflatable region, the air-bag having an upper edge provided with a plurality of mounting tabs, each mounting tab defining an axis, the axis of each mounting tab being inclined inwardly toward a region above the centre of the air-bag.

Preferably, the air-bag is in the form of an inflatable curtain.

Advantageously, each tab is inclined at an angle between 30° and 80°.

Conveniently, the tabs located towards each end of the air-bag are inclined with a more acute angle than tabs located towards the centre of the air-bag.

Preferably, each tab is formed of woven fabric, the fabric having orthogonal warp yarns and weft yarns, the axis of each tab making an acute angle with the orthogonal matrix of the warp and weft yarns.

In order that the invention may be more readily understood, and so that further features thereof may be appreciated, the invention will now be described, by way of example, with reference to the accompanying drawings in which:

FIGURE 1, as described above, is a diagrammatic view of a prior proposed air-bag; and

FIGURE 2 is a corresponding diagrammatic view of an air-bag in accordance with the invention.

As will be appreciated, most of the features of the air-bag of Figure 2 are the same as the corresponding features of the air-bag of Figure 1 and will thus not be re-described in detail at this time.

The primary difference between the air-bag of Figure 2 and the air-bag of Figure 1 is the nature of the mounting tabs. The upper edge 14 of the air-bag 2 shown in Figure 2 is provided with four mounting tabs 20, 21, 22, 23 spaced from one another at respective positions along the upper edge 14. Each mounting tab is in the form a single thickness layer of fabric and each tab is provided with a respective bolt hole 24, 25, 26, 27.

It can be seen that the tabs 20,21,22,23 do not extend perpendicularly from the upper edge 14, but instead each tab 20,21,22,23 is inclined to define an acute angle with the upper edge 14 of the air-bag.

The left-hand most tab 20 is inclined to the upper edge 14 at an angle α which may be between 30° and 80° but which, in the described embodiment, is approximately 45°. The tab 20 is thus inclined quite steeply relative to the uppermost edge 14 of the inflatable curtain.

The next adjacent tab, moving towards the centre of the air-bag, is the tab 21 which is inclined at an angle β, the angle β again being between 30° and

80° but in the illustrated embodiment being 63°. Thus the tab 21 is not inclined as steeply as the first described tab 20. Both of the tabs 20 and 21 are inclined in a direction towards a point located above the centre of the air-bag.

The next adjacent tab, the tab 22, is on the opposite side of the central part of the air-bag and again is inclined relative to the upper edge 14 at the angle β which, in the described embodiment, is 63°, but is inclined in the opposite sense relative to the tab 21, thus again being inclined towards the said point located above the centre of the air-bag.

Finally the tab 23 is inclined at the angle α which is again 45°, again being inclined towards the central point above the centre of the air-bag. It will therefore be seen that the illustrated arrangement has a substantially symmetrical arrangement of the tab angles, about a line of symmetry lying vertically through the central region of the air-bag. However, in other embodiments (not illustrated), it is possible for the tab angles to be arranged in a non-symmetrical manner.

In a conventional air-bag of the type described above, the warp and weft yarns as shown schematically at 28 are co-aligned with and perpendicular to the upper edge 14 of the air-bag. Thus, as the tabs 20,21, 22, 23 are formed from the fabric of the air-bag, each tab is inclined to the orthogonal axes defined by the warp and weft yarns by either the angle α or the angle β.

It has been found that a tab which is inclined to the warp or weft direction is able to elongate with a given load to a greater extent than a tab which is aligned with the warp or weft axes of the fabric. It is thus envisaged that an air-bag provided with tabs as described above will be able to withstand

substantial applied forces, with the loads from those forces being absorbed by the tabs, without the tabs breaking.

The tabs may be woven using a conventional hop-sack weave.

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In the present specification "comprises" means "includes or consists of" and "comprising" means "including or consisting of".